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SECTION OF MORPHOLOGY(ANATOMY, CLINICAL ANATOMY, HISTOLOGY)

СЕКЦІЯ МОРФОЛОГІЇ (АНАТОМІЯ, КЛІНІЧНА АНАТОМІЯ, ГІСТОЛОГІЯ)

MORPHOMETRIC DESCRIPTION OF THE STRUCTURAL CHANGES IN RAT KIDNEYS INDUCED BY ACUTE STRESS REACTION AND CORRECTION WITH MEXIDOL

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Rationale. Morphological studies report that stress reactions have a significant adverse effect on the kidneys. Therefore, the study of stress-related renal alterations, as well as search for ways of their correction is one of the major public health problems to date.

Purpose. To carry out morphometric analysis of albino rats' renal alterations induced by the acute immobilization stress and correction with mexidol.

Methods and Material. Based on international bioethics principles, 15 albino mature male rats were involved into the study. Group I (controls) (n=5) involved intact animals; Group II (n=5) involved animals that were exposed to acute immobilization stress without correction; Group III involved animals, exposed to stress and corrected with mexidol. Acute stress was simulated by immobilization of rats, lying supine for six hours. For the purpose of correction, 100 mg/kg body weight mexidol were single-time administered intraperitoneally 20 minutes prior the period of immobilization. After rats' euthanasia and macroscopic examination of the kidneys, the material was collected for subsequent macromicroscopic and morphometric studies. Micropreparations of the kidneys were stained with hematoxylin and eosin using conventional technique.

Results. The morphometric study has shown dilatation of lumens of proximal and distal convoluted tubules in rats of Group II compared to control animals – 19,24% (from 18,08±0,24 to 21,56±0,64) and 24,60% (from 18,78±0,29 to 23,40±0,65). A significant enlargement of the Shumanski-Bowman's capsule – 12,25% (from 38,44±0,42 to 43,15±0,65) and dramatic dilatation of the capillary lumen - 22,83% (from 2,19±0,16 to 2,69±0,27) was noted in the glomerular apparatus. Mexidol correction revealed that stress-induced renal alterations were less pronounced, namely, insignificant dilatation of lumens of the proximal – 6,96% (from 18,08±0,24 to 19,34±0,52) and distal convoluted tubules – 17,62% (from 18,78±0,29 to 22,09±0,35), enlargement of the Shumanski-Bowman's capsule – 2,83% (from 38,44±0,42 to 39,53±1,44) and dilatation of the capillary lumen – 5,4% (from 2,19±0,16 to 2,31±0,18).

Conclusions. The findings of the morphometric studies have confirmed the appropriateness of the use of mexidol as a nephroprotector in the acute stress.

MORPHOMETRIC STUDY OF THE STRUCTURAL AND FUNCTIONAL CHANGES IN RAT LIVER INDUCED BY THE ACUTE IMMOBILIZATION STRESS AND IN PHARMACORRECTION

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Rationale. The liver is one of the target organs for stress, when the significant morphological changes occur in the liver tissue, which can contribute to the onset and development of pathological processes. Therefore, the analysis of stress-related hepatic alterations, as well as search for ways of their correction is one of the major public health problems to date.

Purpose. Toperform morphometric study of structural and functional changes in rat liver after exposure to acute immobilization stress and pharmacorrection.

Methods and Material. Based on international bioethics principles, 20 albino mature male rats were involved into the study. Group I (controls) (n=5) involved intact animals; Group II (n=5) involved animals that were exposed to acute immobilization stress without correction; Group III (n=5) involved animals, exposed to stress and corrected with torasemide; Group IV (n=5) involved animals, exposed to stress and corrected with mexidol. Acute stress was simulated by immobilization of rats, lying supine for six hours. For the purpose of correction, 0.1 mg torasemide or 100 mg/kg body weight mexidol was single-time administered intraperitoneally 20 minutes prior the period of immobilization. After rats' euthanasia and macroscopic examination of the liver, the material was collected for subsequent macromicroscopic and morphometric studies. Micropreparations of the liver were stained with hematoxylin and eosin using conventional technique.

Results. The morphometric study has shown dilatation of lumens of interlobular veins in rats of Group II compared to control animals – 19,8% (from 6,94±1,08 to 8,32±1,20), as well as spasm of the arteries – 23% (from 3,87±0,18 to 2,98±0,21) and dilatation of the lumens of the bile ducts– 24,5% (from 5,69±0,28 to 7,42±0,25). In the liver lobules, the central veins were dilated – 45,9% (from 25,93±2,92 to 37,84±2,87). Torasemide correction revealed that stress-induced changes in the liver were less pronounced, namely, dilatation of lumens of the interlobular veins – 15,1% (from 6,94±1,08 to 7,99±0,81), narrowing of the bile ducts – 18,1% (from 3,87±0,18 to 3,17±0,12), enlargement of the lumen of the bile ducts – 21.4% (from 5,69 ± 0,28 to 6,91 ± 0,31), enlargement of the inner diameter of the central veins – 28% (from 25,93±2,92 to 33,20±2,04). Administration of mexidol significantly prevented the adverse effect of stress on the liver,